

NATIONAL TRANSPORTATION SAFETY BOARD
 WASHINGTON, D.C.

ISSUED: August 3, 1981

 Forwarded to:

Honorable J. Lynn Helms
 Administrator
 Federal Aviation Administration
 Washington, D. C. 20591

SAFETY RECOMMENDATION(S)

A-81-82

On August 2, 1980, a Hughes 500C helicopter was on a nonscheduled air taxi flight near Kivalina, Alaska. The pilot started a descent from 3,000 feet toward a landing site, during which the power turbine speed (N₂ rpm) climbed from the normal indication of 103 percent to 120 percent, resulting in an overspeed. When the pilot was not able to reduce electrically the excessive turbine speed, he increased the collective to increase torque and attempted to manually control the governor. When this action was also ineffective in reducing the power turbine speed, the pilot elected to enter an autorotation. During touchdown on rolling terrain, the helicopter's main rotor blades flexed downward and severed the tailboom. The pilot, the sole occupant, escaped injury.

The governor, fuel control, fuel pump, and high pressure filter were removed from the Allison 250-C20 turbo-shaft engine and forwarded to a certificated repair station where they were evaluated. The Chandler Evans governor, which had a total time since overhaul of 1,108.9 hours, was disassembled. Metal contamination, consisting of metal filings from the high pressure fuel filter bypass valve seat, were found around the diaphragms in the governor, and score marks were found on the speed weight metering lands. The score marks and the metal contamination indicated that the governor speed weight had seized during operation. Examination of the high pressure filter bypass valve seat showed chatter marks which indicated that the high pressure fuel filter bypass valve had been oscillating and had generated the metal filings. As a result of its evaluation, the Safety Board concluded that the power turbine overspeed resulted from metal contamination, which caused the speed weight to seize.

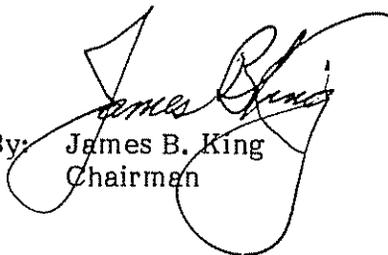
A review of FAA Service Difficulty Reports on the Chandler Evans governor contained 22 reports of overspeed, 7 of which indicated that the governor had been contaminated. On November 14, 1979, the Detroit Diesel Allison Company issued Commercial Engine Service Bulletin CEB-1144, warning that the high pressure fuel filter bypass valve is subject to wear and should be replaced with kit P/N 6896726; the kit includes a replacement filter element for improved service life. The operator of the accident aircraft had not complied with this service bulletin.

The Safety Board believes that if Service Bulletin CEB-1144 was made mandatory, the occurrence of power turbine overspeed caused by governor malfunctions would be substantially reduced.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue an Airworthiness Directive to require compliance with the Detroit Diesel Allison Commercial Engine Service Bulletin CEB-1144. (Class II, Priority Action) (A-81-82)

KING, Chairman, DRIVER, Vice Chairman, and McADAMS and GOLDMAN, Members, concurred in this recommendation. BURSLEY, Member, did not participate.


By: James B. King
Chairman